

PHY 362 ELECTRONICS – 3 CREDITS

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SCHEME OF WORK – SECOND SEMESTER

Course objectives:

When you have learnt the material in this course you would be able to:

1. Use the theory of semiconductors to explain the formation an n-type and a p-type semiconductor
2. Distinguish between electronic components such as diodes, resistors, transistors and integrated circuits
3. Use the theory of semiconductors to design and interpret simple electronic circuits
4. Undertake practical work involving determination of parameters of simple electronic circuits

Theory of semiconductors

Electron-hole pair. Energy bands in solids. Movement of electrons through diffusion and under a potential field. Formation of p-type and n-type semi-conductors (doping). Formation of p-n junctions – diodes, and transistors

Components of electronic circuits

Resistors, capacitors and their identification

Measurements across p-n junctions

Current –Voltage characteristics of a junction diode

Current – Voltage characteristics of a transistor (Input, output and transfer characteristics)

Amplifiers

Common emitter mode

Common base mode

Common collector mode

Wave rectification

Half-wave rectification; Full-wave rectification and their uses

Wave transmission

Frequency modulation and Amplitude modulation

Heterodyne receivers – Demodulation

Some interesting Circuits

Integrator; Differentiator, Summing amplifiers

Oscillators (e. g. Schmitt trigger)

Conversion of analogue signal to digital signal

REFERENCES

1. Elements of electronics for scientists – R. L. Havill and A. K. Walton – 3 copies in Departmental Library
2. Teaching physics: A guide for the non-specialist – Jonathan Osborne and John Freeman
Main Library QC 30.KOS1

Note:

Resistor colour codes: Black = 0; Brown = 1; Red = 2; Orange = 3; Yellow = 4; Green = 5;

Blue = 6; Violet = 7; Grey = 8; White = 9

Tolerance: Gold = 5%; Silver = 10%